37. $\perp$ $y = x^3 - 3x + 1$ at $(2,3)$

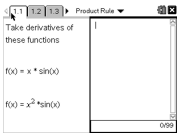
39. find (x,y) points when tan $\parallel$ x-axis

$y = 2x^3 - 3x^2 - 12x + 20$

Sep 10-9:32 AM

3.3b Rules for Differentiation

Use Product Rule.tns to discover the rule for taking derivatives of products of functions.



$\frac{d}{dx} x^2 \sin x \neq 2x \cos x$

$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$

u & v represent functions of x

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$\frac{d}{dx} \underset{u}{x^3} \underset{v}{\sin x} =$ $u \cdot v' + v \cdot u'$

$x^3 \cos x + \sin x \cdot 3x^2$

$x^3 \cos x + 3x^2 \sin x$

Sep 10-10:07 AM

Take the derivative of $y = (x^2+1)(x^3+3)$

$y' = (x^2+1)3x^2 + 2x(x^3+3)$

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The Quotient Rule

$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v \cdot u' - u \cdot v'}{v^2}$

Differentiate $f(x) = \frac{x^2-1}{x^2+1}$

$f'(x) = \frac{(x^2+1)2x - (x^2-1)2x}{(x^2+1)^2}$

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$\frac{d}{dx}\left(\frac{x\sin x}{2x+1}\right) = \frac{v \cdot u' - u \cdot v'}{v^2} = \frac{(2x+1)[x\cos x + \sin x \cdot 1] - x\sin x \cdot 2}{(2x+1)^2}$

Sep 10-10:21 AM

Power rule for negative integer powers of *x*

$y = \frac{1}{x^4} = x^{-4}$

$y' = -4x^{-5} = -\frac{4}{x^5}$

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Find an equation for the line tangent to the curve $y = \frac{x^2+3}{2x}$ at x=1

$y = \frac{4}{2} = 2$

$y' = \frac{2x \cdot 2x - (x^2+3) \cdot 2}{(2x)^2}\Big|_{x=1} = \frac{4-8}{4} = -1$

tan line: $y = -1(x-1)+2$

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